

# Investing in Agricultural Value Chains & Climate Smart Agriculture

Marc Sadler

Adviser  
Risk and Markets  
The World Bank

# Agriculture, Climate Change & Development

# Agriculture's Relevance to Achieving the WBG Twin Goals

## Ending Poverty

- ~ 900 million rural poor in 2010 (78% of total poor)
- ~ 750 million poor in 2010 were working in agriculture (63% of total poor)
- ~ 200 million rural poor could migrate to urban areas by 2030 (based on projected urbanization)
- ~ 700 million poor people remaining in rural areas to be lifted out of poverty by 2030

## Shared Prosperity

Increased supply chain efficiency helps lower consumer food prices thereby raising real incomes of the poor, who spend a large share of their income on food

More and better jobs (farm, non-farm rural, agro-processing)

Improved food security (food shocks increase poverty, civil unrest, and can impair human capital development)

# Key Challenges in the Global Food System to 2030

**By 2030**

**Agriculture-based**

**Transforming**

**Urbanized**

**Developed**

## Food Needs

Higher food need, climate change to reduce crop yields (by 5% per 1°C↑)

Total (kcal) needs. (FAO)

+93%

+38%

+31%

+9%

Meat needs (FAO)

+109%

+124%

+50%

+16%

## Jobs and Income

4.5% per capita income to meet poverty targets

Poverty rate (%) (WB)

47%

24%

4%

-

Jobs in agriculture (%)

69%

38%

17%

4%

## Sustainability

If not reduced, emissions from agriculture+ = 70% of all emissions for 2°C↑

GHG emissions

20%

44%

24%

12%

Degraded land (1982-2006)

+24%

+25%

+25%

+17%

## Health Impacts

High rates of undernourishment, rising rates of obesity

Undernourishment (%)

30%

18%

10%

3%

Obesity (%)

9%

16%

21%

23%

# Poverty, Hunger, Climate and CSA

## *Challenge and Response*

# 1

## WHAT IS THE CHALLENGE?

*To build food systems that meet increasing demand while remaining profitable and sustainable in the face of Climate Change.*

# 2

## WHAT WILL IT TAKE?

1. *Increasing productivity sustainably*
2. *Enhancing the resilience of producers and supply chains*
3. *Reducing Emissions*

# 3

## CAN IT BE DONE?

*Yes, but we need to connect Climate Change with the bottom line of **farmers** and **food businesses***

CSA

=

**SUSTAINABLE  
AGRICULTURE**

+

**RESILIENCE**

-

**EMISSIONS**



# The Approach of the World Bank

## 1 CLIENT COUNTRY ENGAGEMENT

*Advising clients and designing projects to increase productivity, build resilience and reduce emissions.*

---

## 2 MAINSTREAMING

*Applying a 'Climate Lens' to our work across sectors, both from adaptation and emission reduction perspectives.*

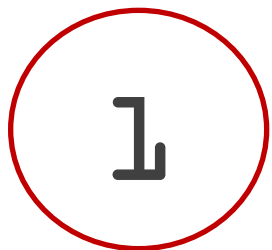
---

## 3 METRICS & TARGETS

*Of the current World Bank agriculture portfolio:*

- *75% of projects improve productivity.*
- *31% build resilience.*
- *20% reduce emissions.*
- *12% are fully climate-smart, working towards all three goals:  
\$850 Million in the fiscal year 2011/2012*

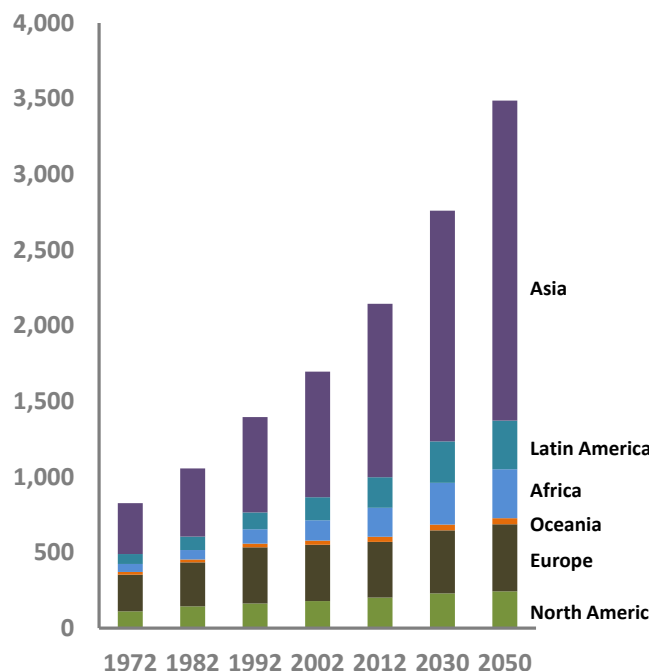
# CHALLENGES



# PRODUCTIVITY

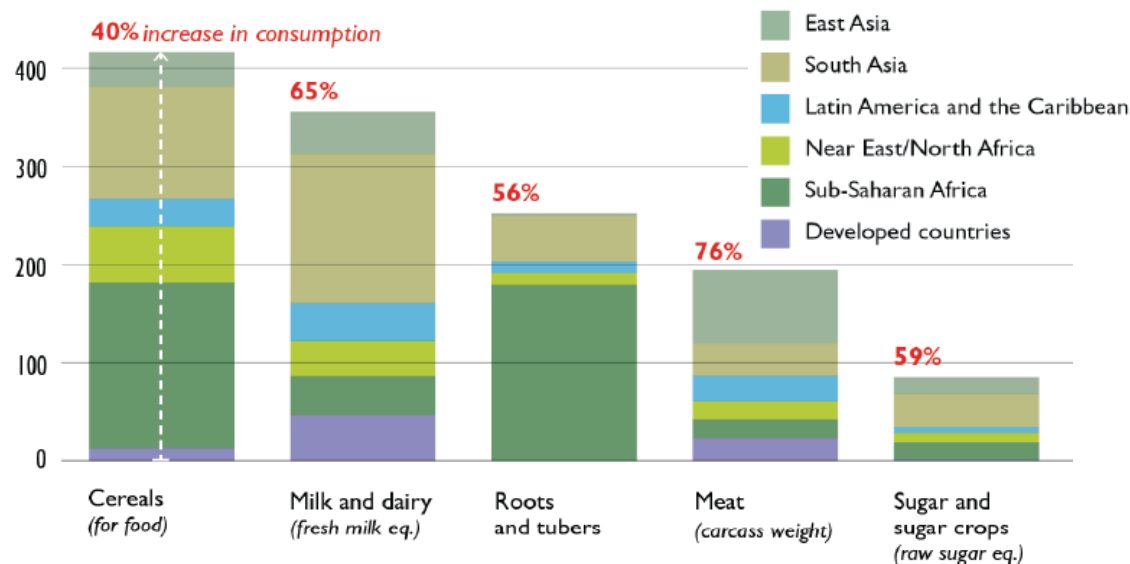
## Feeding 9 Billion People in 2050

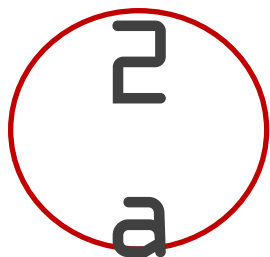
**Food Production by Region 1972-2050**  
(Constant 2004-06 US\$)



**Food Demand By Commodities in 2050 relative to 2005-07**

(Billion kg per year)



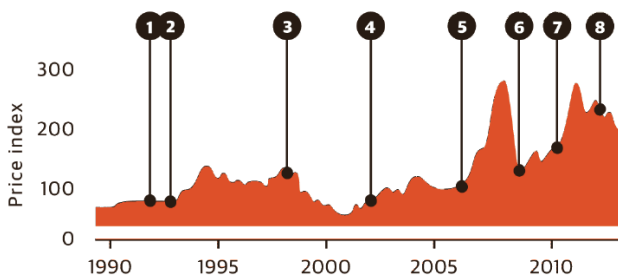


# ADAPTATION

## Climate Change Impacts on Food Systems

### Problems Today: *Short Term Volatility*

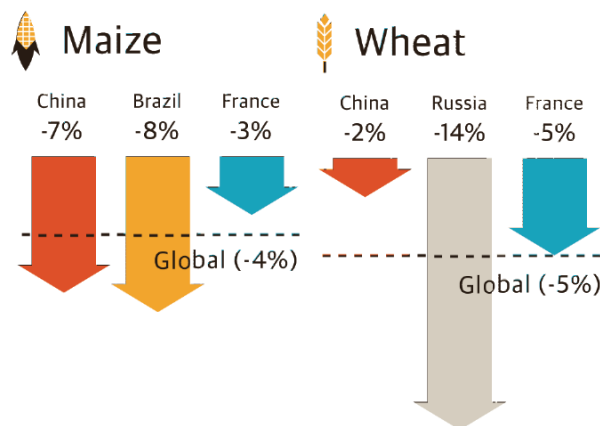
Recent price spikes for food commodities have been linked to extreme weather events



1. Australia wheat. 2. US maize. 3. Russia wheat. 4. US wheat, India soy, Australia wheat. 5. Australia wheat. 6. Argentina maize, soy. 7. Russia wheat. 8. US maize.

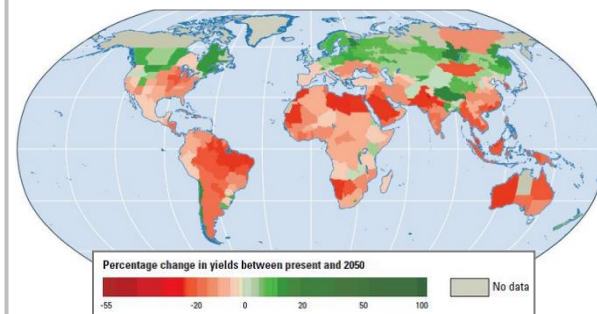
### Issues Tomorrow: *Medium Term Yield Losses and Increasing Cost Structures*

Maize and wheat yields show climate impacts



### Uncertain Future: *Production Collapse in the Longer Term*

Maize and wheat yields show climate impacts



# 2b

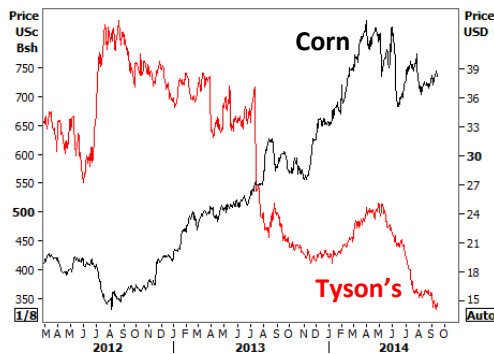
## ADAPTATION

### Climate Change Impacts on Food Companies

#### SHORT TERM

##### Price Volatility Impacts Shares

A price hike in corn (black) drives down the share price of Tyson Foods (red)

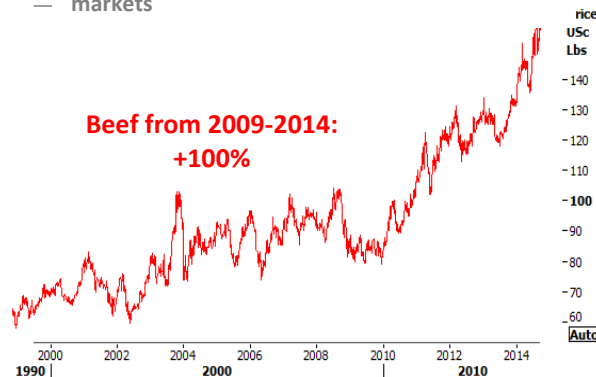


- Volatile commodity prices can have very real impacts on business – and share prices

#### MEDIUM TERM

##### Increasing Cost Structure

The price for beef live weight increasing steadily due to pressure from feed and pastureland markets

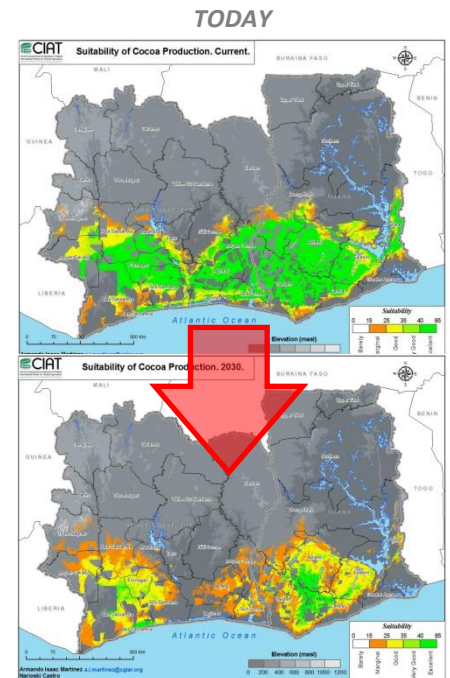


- Beef is an example of a commodity where supply has come under pressure because of the scarcity of underlying resources

#### LONGER TERM

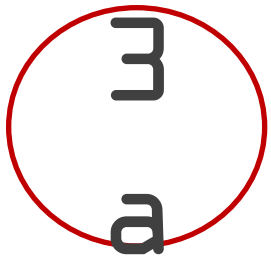
##### Disappearing Supply Chains

Areas suitable for Cocoa production in Ivory Coast, today (top) and in 2030 (bottom)



2030

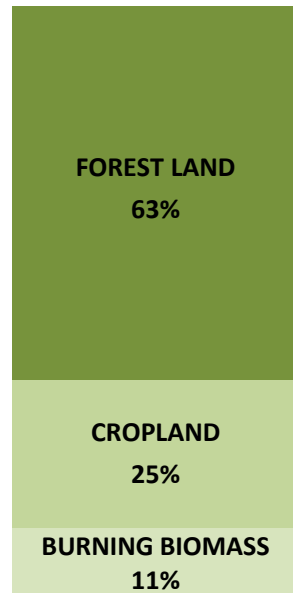
**Food companies must build resilience at the farmer level through supply chain development (increasingly in developing countries)**



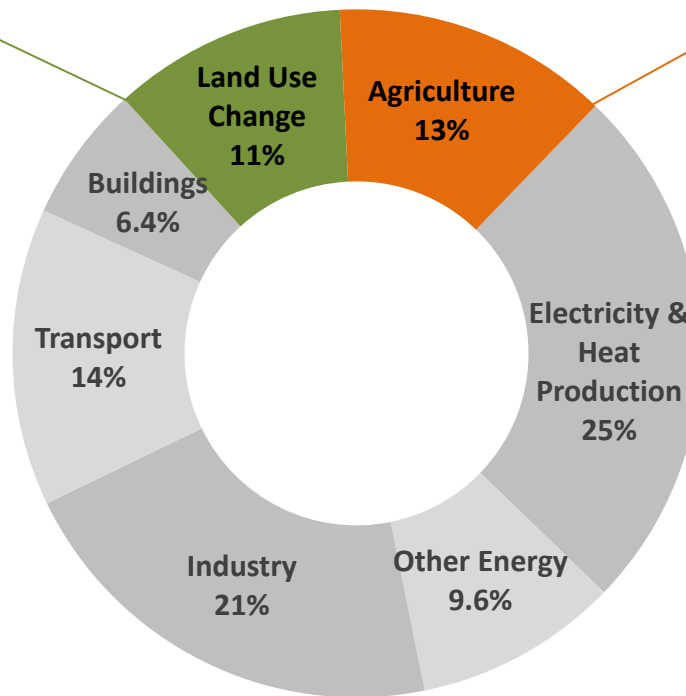
# EMISSIONS

## Agriculture: Today

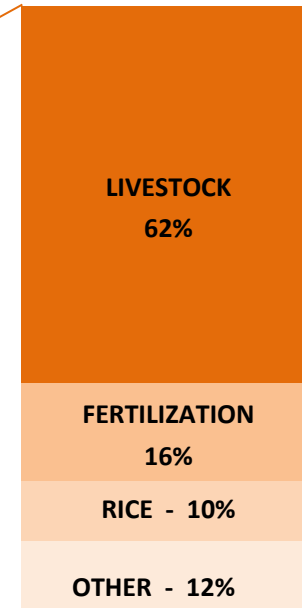
**LAND USE CHANGE**  
~11% OF TOTAL

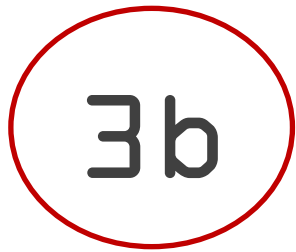


**TOTAL EMISSIONS**



**AGRICULTURE**  
~13% OF TOTAL





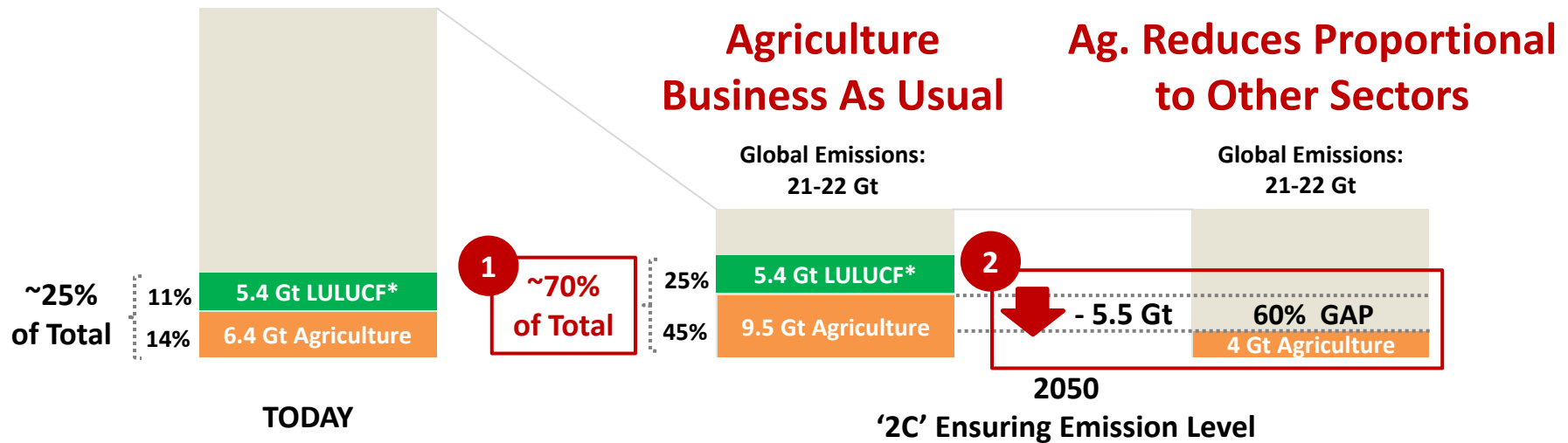
# EMISSIONS

## Agriculture: Tomorrow

Projections of Global, Agriculture and Land Use Change Related Emissions towards 2050

(Gt CO<sub>2</sub>e)

Global Emissions:  
49.1 Gt



1

*By 2050, Agriculture and Land Use Change could represent 70% of Global Emissions - if global emissions are reduced in accordance with a 2C goal, while Agriculture were to remain in business as usual.*

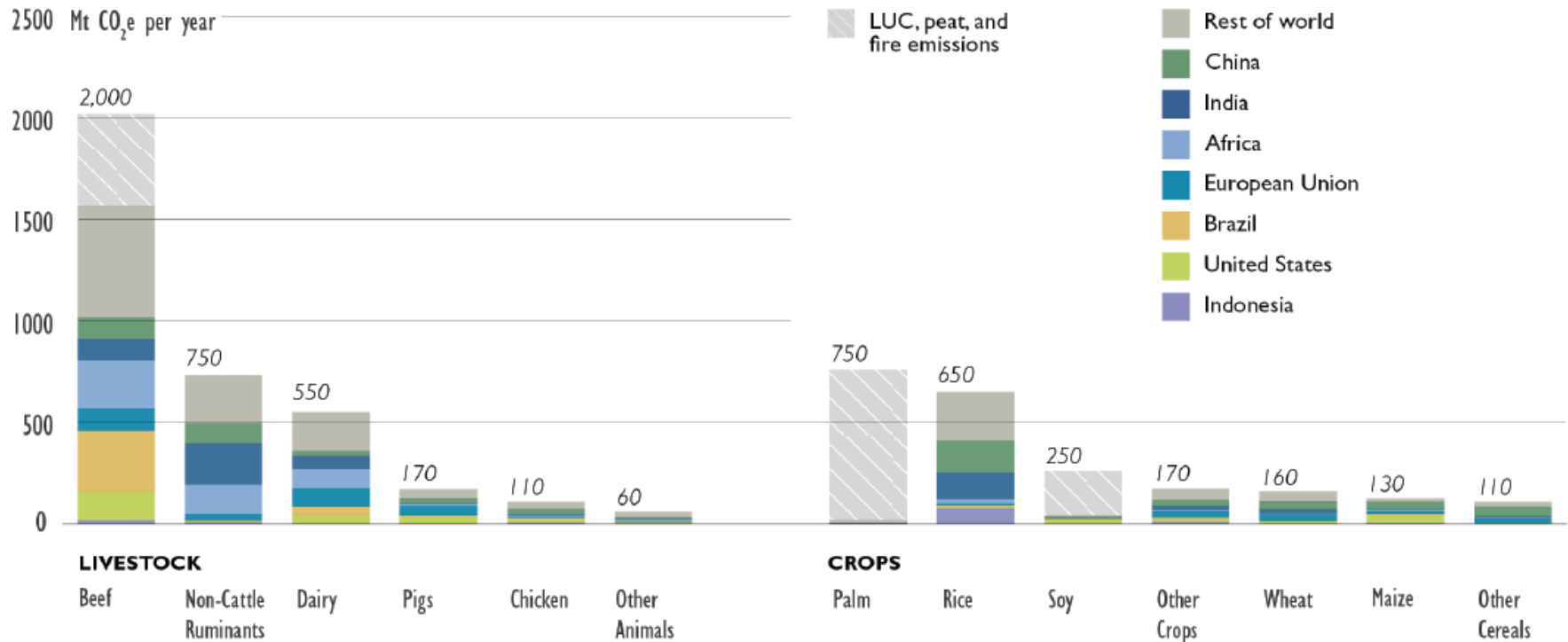
2

*By 2050, Agriculture will therefore have to reduce its emission intensity by 60%, if it is to maintain its footprint in parallel with overall emissions reductions. This already assumes emissions from Land Use Change will have fallen to zero.*

# OPPORTUNITIES

# Agriculture Emissions Come From a Small Number of Commodities

Global emissions by commodity, 2008



Source: CEA analysis based on: FAOSTAT 2008; Gerber et al., and personal communications with Paul West; Institute on the Environment, University of Minnesota.

# Opportunities to Deliver on Outcomes

## NORTH AMERICA & EUROPE

- Biodigesters
- Fertilizer Mgmt
- Supply Chain Mgmt

## ASIA

- Rice (AWD+)
- Livestock Efficiency
- Biodigesters
- Fertilizer Mgmt
- Degraded Land Restoration

## AFRICA

- Agroforestry
- Pasture Management
- Fertilizer Application

## LATIN AMERICA

- Livestock Efficiency
- Agroforestry
- Rice (AWD+)
- Pasture Mgmt
- Fertilizer Mgmt
- Zero Till

**P** - Productivity  
**R** - Resilience  
**E** - Emissions

# ENTRY POINTS FOR ACTION AND FINANCE

# Leveraging the Global Agribusiness Value Chain

## Key Characteristics of the Global Agribusiness Value Chain

	Input	Farmers	Traders	Food Companies	Retailers
Sales: US\$bn (approx.)	400	3'000	1'000	3'500	5'400
Number of Players	100s	Billion	Tens	Thousands	Millions

## Key Points

- Leverage points to drive change are at supply and demand ends of the chain.
- Transformational impact comes from linking the chain more strongly (value chain investments)
- OECD/BRIC public expenditure on ag \$430 billion per year – important, but not critical driver

# So What Does CSA Look Like for the Food Business?

## *Supply Chains Coming Full Circle? – Not Quite*

### **LOCAL OWNERSHIP**

Challenge:

Global trade system little developed

Response:

Processors & retailers invested in production and processing assets

1980s

### **SHEDDING/CONSOLIDATION**

Challenge:

International expansion requires capital, globalization gaining pace

Response:

Concentration of capital on expansion and processing, shedding of production assets

1990s

### **SUPPLIER RELATIONSHIPS**

Challenge:

Increasing consumer scandals and disease threats, together with just-in-time delivery and shrinking margins

Response:

Investment relationships with select suppliers, certification schemes

2000s

**TODAY**

### **WHAT NEXT?**

Challenge:

Suppliers under pressure from Climate Change and natural resource scarcity

Customer and food safety driven demands for traceability

Production risk transmitted through supply chains to processors & retailers

Potential Responses:

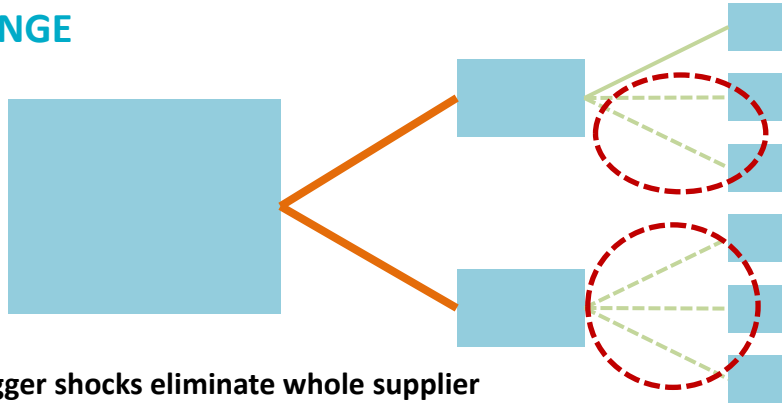
Reestablishing control of productive assets? OR

**Building up producer resilience & capacity**

# Building Resilient Supply Chains

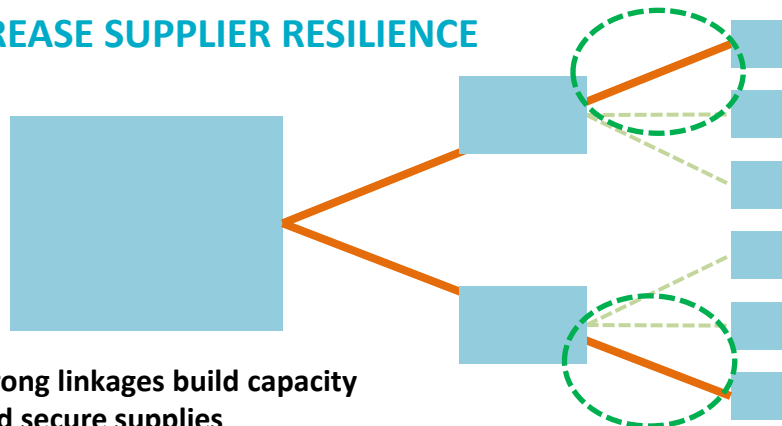
## *Ensuring a Consistent Supply of Raw Materials*

### OLD MODEL CAN'T COPE WITH CLIMATE CHANGE



Bigger shocks eliminate whole supplier clusters/regions

### NEW MODEL DESIGNED TO INCREASE SUPPLIER RESILIENCE



Strong linkages build capacity and secure supplies

To ensure stable supply chains and sustained production growth, producers will need support to deal with:

- Increased weather variability
- Unpredictability of planting seasons
- More frequent and varied pest and disease threats
- Larger shares of agricultural lands under extreme climatic conditions (drought, heat waves)
- Reducing unsustainable green house gas emission levels

# Advantages of Resilient Supply Chains for Companies

## *Better Managed Risks*

### SHORT TERM

- Tighter control of costs (managing price risk)
- More responsive suppliers
- More dependable sources of raw materials
- Increased quality & traceability

### MEDIUM / LONG TERM

- Better control and planning of cost structure
- Positioning ahead of regulatory risk related to emissions
- Better positioning in local markets
- Positive brand impact from leadership

---

 **SHARE PRICE**

 **MARKET SHARE**

# Advantages of Resilient Supply Chains for Development

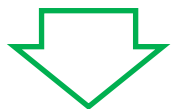
*Better Managed Risks = Improved Incomes & growth*

## SHORT TERM

- More stable input and output markets
- More empowered & responsive farmers
- More dependable production and food security
- Increased quality & traceability

## MEDIUM / LONG TERM

- Better management of resources
- Reduced emissions and improved environmental impact
- Development of local markets
- Positive brand (including country) impact from leadership



**POVERTY**



**PROSPERITY**

# Traditional view of challenges to farmer finance

Constraint	Solution
<b>“It is just too risky”</b>	<ul style="list-style-type: none"><li>- Increase bank ability to assess AG risk</li><li>- Assist banks to manage portfolio risk through insurance</li></ul>
<b>“Farmers have no collateral”</b>	<ul style="list-style-type: none"><li>- Assist banks to move to transactional finance</li><li>- Improve liquidity provisioning</li></ul>
<b>“Enforce against who for default?”</b>	<ul style="list-style-type: none"><li>- Introduce improved identification systems</li><li>- Improve legal enforcement</li></ul>
<b>“There is no liquidity”</b>	<ul style="list-style-type: none"><li>- Not true for short term, but issue for long term – more focus on deposit taking for rural customers</li></ul>
<b>“It costs too much - farmers are too spread out and don’t know how to apply for loans”</b>	<ul style="list-style-type: none"><li>- Build “container branches”</li><li>- Temporary banking at rural ag markets</li><li>- Simplify loan procedures and applications</li><li>- Formalize value chain financing with input suppliers and traders (and others)</li></ul>

# What does the “blue sky finance” look like, especially linked to CSA?

Tools	Description
<b>CSA rate discounting</b>	Farmers who deliver on the 3 goals are “less risky” and therefore are better credit risks (so lower interest rate)
<b>CSA bond</b>	Climate finance seeking mitigation goals can be used to create funds used to discount interest rates
<b>CSA sustainability bond</b>	Many adaptation and mitigation activities require medium term finance, funds from the bond could be leveraged to provide primary liquidity or guarantee facility to underwrite lack of assets of farmers
<b>Aggregated risk pooling for CSA</b>	Global or regional product providing aggregated insurance product deliverable through formal financing channels or direct to farmers through bonded loan accounts
<b>Community funding for CSA</b>	For CSA based management of communal assets, climate financing could be directed through CDDs for provision of communal goods.
<b>Leveraged retailer finance</b>	With consumer awareness rising of risks to food security and climate change, there are possibilities to leverage purchasing power into both short and medium term finance for agriculture.

# So What Are the Current Options?

*Resilient Supply Chains Require Integrated Solutions*

